overall success rate is about 75 percent even under optimal conditions of cell culture and analysis. Physicians must bear in mind that diagnostic amniocentesis should be undertaken with the understanding that abortion is the only available therapy.

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Status of C Type Virus in Cat Tumors

C type RNA tumor viruses are proved to be the causative agents of malignant lymphoma and sarcoma in domestic cats. The incidence of feline lymphoma is four to five times greater in cats than in humans. There is no convincing evidence for infectious spread of these agents under natural conditions between cats or from cats to other animals or to man. Evidence suggests but does not prove that the C type virus genome is inheritable, presumably in the form of DNA.

House cats differ from other randomly bred vertebrate species in showing a marked degree of spontaneous expression of their latent C type virus genome in the form of group-specific antigen and replicating C type particles.

A human sarcoma cell line, previously free of C type virus particles, started to produce large numbers of such virus particles after transplantation into a fetal kitten. This virus (RD-114) proved to be no known cat or other mammalian C type virus and may thus be wholly or partially of human origin.

MURRAY B. GARDNER, M.D.

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Evaluation of Hepatotoxicity by Electron Microscopy

Examination of liver biopsy material with the electron microscope can be a useful aid in studying the potential hepatotoxicity of drugs and environmental toxins. Light microscopy frequently reveals only minimal fatty changes, not necessarily indicative of liver abnormality. Ultrastructural studies, however, often disclose proliferation of the smooth endoplasmic reticulum as well as mitochondrial enlargement; also, crystalline inclusions may be found within the mitochondrial matrix. Other alterations include the development of autophagosomes, pigment inclusions, and, with some compounds, increased numbers of microbodies. Proliferation of the smooth endoplasmic reticulum is associated with increased activity of some of the enzymes located in the microsomal fraction.

Although all of these changes have been found in apparently healthy persons, their presence should alert the physician to the possibility of hepatic injury.

Recent studies on the hepatoxicity of methotrexate indicate that abnormalities may persist for months or even years after the hepatotoxin is withdrawn.

JOHN C. LEE, M.D.

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Lymphomatoid Granulomatosis

Lymphomatoid granulomatosis is a lymphoproliferative disorder associated with angiitis and granulomatosis of the lung, resembling and possibly related to Wegener's granulomatosis. The pulmonary lesions are usually multiple, bilateral

and nodular. They resemble metastatic lesions and predominate in the peripheral portions of the lower lobes, chiefly in young males. Frequently there is an accompanying cutaneous angiitis and panniculitis. Nodular renal lesions resembling those in the lungs can occur, but there is not the glomerulonephritis of the Wegener triad. The central nervous system is involved in one-fifth of the fatal cases. The condition occasionally terminates in atypical lymphoma. Pulmonary lesions may be asymptomatic or associated with fever and non-productive cough. Treatment with steroids may be associated with remission or arrest of the process, but this outcome can occur spontaneously.

AVERILL A. LIEBOW, M.D.

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Pulmonary Veno-Obstructive Disease

Intrapulmonary veins can be specifically occluded by thrombosis and organization. The first manifestation may resemble influenza, but more commonly the onset is insidious, with increasing dyspnea as the chief complaint. One-third of the patients are less than 16 years of age. There is progressive right-sided heart failure without evidence of left atrial enlargement. Radiographically wandering pulmonary infiltrates are seen and Kerley lines are prominent. Angiography may reveal focally delayed emptying of pulmonary arteries. Pulmonary wedge pressure may be elevated or normal. The cause is unknown and no method of treatment is available.

AVERILL A. LIEBOW, M.D.

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Heath D, Scott O, Lynch J: Pulmonary veno-occlusive disease. Thorax 26:663, Nov 1971

Microangiopathic Hemolytic Anemia

The sequential activation of the coagulation factors terminating in the production of thrombin and the formation of a fibrin clot normally occurs in the interstices of a platelet plug. On occasion, due to disease, the activation of the procoagulant enzymes occurs widely in the bloodstream and disseminated intravascular coagulation (DIC) results. Whereas DIC is always a secondary mechanism of disease, microangiopathic hemolytic anemia (MAHA) is tertiary. It results from DIC of a certain type and duration.

Schistocytes, red cell fragments of characteristic morphologic pattern, are the hallmark of MAHA. Fibrin microclots produced by DIC are filtered out of the circulation in arterioles, primarily those of lung and kidney. Rapidly moving red cells are sheared by these fine fibrin strands the way cheese can be cut by a taut wire. The resulting damage decreases the ratio of membrane to hemoglobin and hence the deformability of the schistocytes. The most severely damaged cells lyse, releasing hemoglobin. Less severely traumatized cells circulate briefly and are removed within a few hours by the spleen. Only those cells which still possess a high enough ratio of membrane to hemoglobin are deformable enough to persist in the circulation as schistocytes.

In addition to the obvious sequel of anemia, MAHA causes hemoglobinemia as a result of intravascular lysis of severely damaged cells; bilirubinemia due to increased splenic destruction; thrombocytopenia due to DIC; and, should the process become subacute, erythroblastemia as the bone marrow releases nucleated red cells into the peripheral circulation in an attempt to compensate for hemolysis.

Postmortem tissues of patients who had MAHA during life often do not show the microclots of fine fibrin strands that cause the red cell damage, for they are rapidly incorporated into coarser, more amorphous deposits of fibrin. Strongly